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From Obsolescence to Adaptive Re-use

Rehabilitating Building 661 at Langley Air Force Base

Old buildings are not ours.... They belong partly to those who built them, and partly to the generations of mankind who are to follow us.... What we ourselves have built, we are at liberty to throw down. But what other men gave their strength, and wealth and life to accomplish, their right over it does not pass away with their death.

John Ruskin (1819–1900), English author and critic

This quote from John Ruskin iterates what is perhaps at the crux of many preservation efforts. That is, that old buildings, like objects in museums, are direct links to the past and therefore in many instances, worthy of preservation. In the case of the renovation of Building 661 at Langley AFB in Hampton, Virginia, this ethic was not only considered, it was actually applied.

Originally known as Langley Field and established in 1916, Langley AFB is the world's oldest, continuously operating airbase. Now occupying 3,167 acres in Hampton, Virginia, Langley AFB played a unique role in the development of American aviation. It originally served as an aeronautical experimental station and proving ground for the Army and the National Advisory Committee for Aeronautics. Langley Field was also unique as the first permanent military airfield in the United States and today its prominence continues as Headquarters to the Air Combat Command, one of eight major commands in the Air Force, and the 1st Fighter Wing.

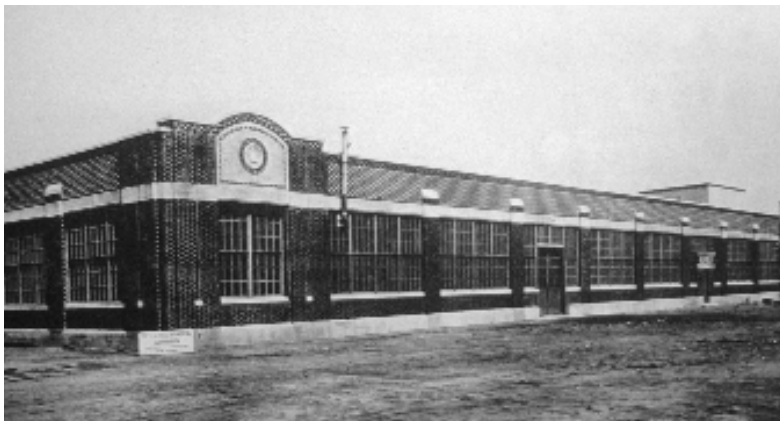
Albert Kahn, a prominent Detroit architect who designed industrial facilities for the Packard Motor Company, Pierce Arrow, and the Ford Motor Company among others, was selected by the Army as the chief architect for design of the aviation experimental station in Hampton. Kahn developed a Beaux-Arts inspired site plan, with a bridge over the Back River from Hampton leading to a traffic circle and streets that radiate outward—one to the housing and administrative area to the east and the other to the flight line and industrial area to the west.

Work began on the site in April 1917. Temporary barracks were completed, and the experimental station named Langley Field. In July 1918, the Army took responsibility for construction work from the original contractor. By the time of the Armistice in November 1918, when major construction work was halted temporarily, a number of permanent buildings had finally been completed, including the Machine Shop (now Building 661). All told, over $15 million was eventually spent to implement Kahn's plans and by 1920, Langley Field was firmly and permanently established.

Building 661: Design and Use

Building 661, one of the first permanent structures on the base, was designed as a machine shop with two rows of concrete-framed sawtooth skylights to illuminate the interior portions of the building. The exterior was built of load-bearing brick piers infilled with brick under concrete window sills and steel-framed windows. A continuous band of reinforced concrete at the lintel height supports concrete beams. A grid of interior columns spaced 20 feet on center also supports the beams, which in turn support the reinforced concrete roof slab and the skylight structures.

This two-component structural system, brick on the exterior and concrete on the interior, reflects a refinement of 19th-century industrial construction methods where load-bearing masonry walls enclosed interiors with heavy timber frames, and later, cast iron frames. Many of Kahn's industrial structures were of all-concrete construction including exposed concrete supports instead of brick piers, and glazing running the full width from column to column. But such a construction method was perhaps considered too raw and unfinished for the Machine Shop at



Machine Shop (c. 1918), Langley Field, Virginia.

Langley Field, which was intended to be a fairly prominent building. Attention was lavished on the decorative brickwork that adorns the exterior of the parapet and the re-entrant corner piers.

Building 661 was constructed as a machine shop, used for a time as a garage, converted to a Post Exchange and commissary, then used as a publications warehouse, mail distribution center, and cafeteria. At some point in the 1940s, a large addition was constructed along the entire length of the building's rear elevation. A subsequent undated drawing, likely dating to the 1950s, indicates the skylights were sealed with asbestos board and covered with roofing material. Insult was added to injury in the 1960s when a number of steel-framed windows were replaced with eight-inch glass block.

Project Background

The project to renovate Building 661 and two other historic buildings was first conceived in the early 1990s. It was programmed as a 1997 Military Construction (MILCON) project, the purpose of which was to provide administrative space for additional personnel resulting from the merger of the Tactical Air Command with the Strategic Air Command and the creation of Air Combat Command at Langley AFB.

The project scope included development of a design for adaptive re-use of the building, removal of the non-contributing and architecturally incompatible rear addition, and restoration of key architectural elements, including steel-framed windows and skylights. It also addressed repair of failing structural and masonry systems and complete replacement of roofing, electrical, mechanical, and plumbing infrastructure.

From the start, design was based upon two basic tenets: creation of efficient and functional building spaces to meet the needs of contemporary office users, and respect for and restoration of the significant historic qualities of the structure. Consultation with the Virginia State Historic Preservation Office (SHPO) began almost immediately and, in fact, preceded the actual start of design. In-progress design review board meetings were regularly attended by both the SHPO representative and the installation Cultural Resource Management Officer. As a result, the consultation process was nearly seamless and the final design solution one that all parties could agree upon.

Today, the facility is still under renovation and the new occupants not yet in place. Work began in January 1998 and the estimated completion date is June 2000. Project managers are confident that the goal of providing efficient building space will be met. As for restoration of the structure's significant historic features, the final consensus may be that the project was more a renovation than a restoration in the truest sense of the word. Throughout the demolition and construction process, numerous serious unforeseen conditions were discovered. Structural failure in many cases was severe and exacerbated by demolition of building components. As a result of budget constraints, money originally earmarked for restoration of exterior elements, lighting, parking, and landscaping had to be diverted to correct structural problems.

Lessons Learned

While there were many headaches, debates, and challenges associated with the Building 661 project, there is a common thread of thought among the architect, the government's construction representative, and the base cultural resource manager. That is, the intangible benefits of such a project cannot not be overlooked or undervalued. In fact, at many times, being mindful of these benefits made the difficult situations easier to bear. Some additional lessons learned:

- Involve your SHPO early and often.
- Be realistic in defining whether the project is a renovation or restoration; expect trade-offs given budget constraints.
- Conduct extensive structural testing prior to developing a final budget and design.

Building 661, former Machine Shop (c. 1995, before rehabilitation).

- Consider a design-build contract to maximize flexibility, consistency, and accountability.
- The importance and value of a qualified contractor cannot be understated. A great contractor for new construction is not necessarily a great choice for renovation/restoration of a historic structure.
- Educate your contracting officer on the differences between working on a modern structure versus a historic one. Make him or her sensitive to specific contractor qualifications. The same goes for your contractor, your building inspectors—anyone associated with the project.
- If you don't use the right kind of contractor, expect delays and the need to spend large quantities of time researching and selecting materials and restoration methods.
- Be specific about materials during the design phase. Is there a standard material for replacement brick or will it have to be custom made? There are cost ramifications here also.
- If contingency money is needed after the project starts, expect this to create delays, especially if the money is for a custom or special order item. Consider, too, that there will likely be costs associated with such delays.
- Finally, if you are the project architect, expect a need for your constant involvement. In the case of the Machine Shop, there have been extended periods when the project manager had to call the architect for advice and direction several times a day.

Photos courtesy 1st Civil Engineer Squadron, Langley AFB, Virginia.

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Building 661, former Machine Shop with rehabilitation nearing completion, December 1999.